September, 1955

THE CHEMIST

VOLUME XXXII NUMBER 9

Dr. E. H. Northey, F.A.I.C.

Receives Honor Scroll of New Jersey Chapter

(*See Page* 325)

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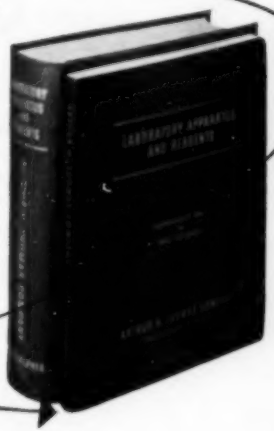

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Reg. U. S. Pat. Off.

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IN THIS ISSUE

Editorial:

Propaganda, Probability and Some Problems of Chemists, Karl M. Herstein, F.A.I.C., & D. Babcock Keyes, F.A.I.C. 321

Some Problems of Chemists in a Growth Industry, Dr. E. H. Northey, F.A.I.C. 325

Presentation to Dr. Northey 327

Group Insurance Offered by New York AIC Chapter 330

Keep the Gears in Mesh, Dr. Charles D. Flory 331

Human Problems of the Research Director, C. A. Stokes 339

Council 345

AIC Activities 345

Will You Come 346

Opportunities 347

For Your Library 348

Something New 351

Condensates 352

TO COME IN OCTOBER

Dr. Paul W. Bachman, vice president of Davison Chemical Co., will explain how best to utilize the services of consultants to get results and he will also show how to avoid complications that may affect their work. • The human interest story will be the presentation of the Honor Scroll of the Louisiana AIC Chapter to Dr. A. R. Choppin, F.A.I.C. • "Research at the Petroleum Experiment Station of the U. S. Bureau of Mines" by Harold M. Smith, will point out some of the work being done by U. S. government chemists.

TO SERVE YOU

Baker & Adamson Division ..... Inside Front Cover
Bios Laboratories 338
Corning Glass Works 320
Croll-Reynolds Co. 329
Harchem Division ..... Inside Back Cover
O. Johnson & E. Scudder 341
The Lento Press 348
Molnar Laboratories 344
Phoenix Chemical Laboratories 349
Robinette Research Laboratories 351
Foster D. Snell, Inc. 347
Standard Scientific Supply Co. 324
R. Steckler Laboratories 343
Arthur H. Thomas Co. 317
Truesdail Laboratories, Inc. 352
U. S. Stoneware ..... Outside Back Cover

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Opportunities ... 347

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Molnar Laboratories ... 344
Phoenix Chemical Laboratories ... 349
Robinette Research Laboratories ... 351
Foster D. Snell, Inc. ... 347
Standard Scientific Supply Co. ... 324
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EDITORIAL

Propaganda, Probability and Some Problems of Chemists

Karl M. Herstein, F.A.I.C., and D. Babcock Keyes, F.A.I.C.

BY DEFINITION, a propagandist is interested in presenting and in having accepted only *his* side of the story. Propaganda differs from brain washing only in degree and in the amount of duress involved. In either case superficial thinking may lead to acceptance of the misconceptions presented and this retards progress.

As the voice of the propagandist today roars in the land many misconceptions become traps into which the unwary may fall. Most of these traps are the use of words. Who is a "liberal" and who is a "conservative"? If your propagandist is a little to the left of center, all to his right are "rock-ribbed" conservatives and ergo menace society. If our propagandist is a little to the right, all on his left are "crack pots" and should be placed in a mental institution. A little calm judgment and the application of probabilities leads to the conclusion that both verdicts are wrong.

Because of the prevalence of propaganda, misconceptions once formed are hard to remove. Fifteen years ago our "Militarists" used the phrase "equality of sacrifice" to propagandize the public. They shouted to the house tops that "every able bodied young man should in time of war serve in our Armed Forces." The scientific and engineering world immediately took issue with this statement. As there are far more papas and mamas whose sons are *not* scientists or engineers, this misconception was gleefully accepted by the public and of course, by the politician who wished to be re-elected. Realizing that our Armed Forces could not possibly use all of these young men at once, Congress set up a "*Selective* Service System", following the custom inaugurated in World War I, but more recently (1951) corrected this "error" and removed the word "Selective" from the title of the law but kept the principal of selectivity—thus giving the law more "flexibility."

In order to maintain "equality of sacrifice" we speak of "deferring" certain young scientists or engineers whose civilian occupation and specific activities seem to be essential to the defense of the country. This implies that these young men should quickly finish their civilian job and rush madly into the fighting forces, because "only in a uniform can they truly serve their country." The public accepts this popular fallacy and fifteen years of argument has done little to correct this misconception.

"Equality of sacrifice" like the tax principle of "soaking the middle class because they have the cash to pay the bill," seems to be here to stay. Neither the technical world nor the industrious and highly intelligent middle class are organized nor are they represented in Washington.

Another misconception to which chemists are liable is that there is no *professional* difference between the chemist and the chemical engineer on the one hand and the physician or lawyer on the other hand. Whoever heard of a *family* hiring a *chemist* to give any of its members professional advice? Why should there be an urge on the part of anyone to promote such a fallacy? Let us suppose you are a chemist working in an industrial organization and you believe you are underpaid. Physicians generally receive large financial rewards for their work. Ergo, chemists should pattern their organization after the medicos and all will be rosy in their economic life. Only as much thought as when uncorking a bottle shows the error in this extrapolation.

Suppose you have just received your Bachelor's degree in chemical engineering, aren't you an engineer? Well maybe, but again the grand, old law of probability says, "No chance." Suppose on the other hand you are a modest fellow and you say to yourself, "I'm not a *real* engineer *now*, but with a little luck I will be, ten years from now." Will you? Probably not: Now, ten years later when you have become a competent executive in an industrial concern, you are told that the only reason you are no longer a real engineer is because engineers are so poorly paid. It is also "obvious" that "you being a smart fellow left this poorly paid profession and grabbed a fat job with short hours and the easy life of the executive." Fooie! You know this isn't true, *but* the gullible chap believes it.

Chemists and chemical engineers who as students state that they wish to spend their lives in industry are trained primarily as potential technical executives. Why? Because the lone scientist or engineer must work with people and in organizations to contribute much today, unless, of course, he is a genius. How many geniuses do you know? Executive ability is a necessary qualification for anyone when he is required to organize the efforts of others.

Here is a third problem that faces chemists and a little analysis of clear thinking about it:

Let us suppose you are a chemist, over fifty years of age; you have had twenty-five years of experience; you consider yourself a success and can prove it, but you suddenly find yourself out of work, and at no time in your life have you ever looked for a job because always before you have received offers and you merely selected the one that appealed to you most. Suppose also your wife is unable to provide for your support; your children are having a tough time because

of the high taxes and the inflated dollar, and you feel old, tired, and dejected. Suppose you are told you may have been good once but not now; that you know too much about too little or too little about too much; that your friends can't hire you at a decent salary because they cannot afford to bring in someone of your caliber from the outside, and their pride won't allow them to offer you a "modest" salary; or that your "abilities" are pure fiction, you were just very lucky; or you have an engaging personality which fools the boss, but only for the moment. Under such conditions wouldn't you believe the propagandists who said, "There is no shortage of chemists—they are a dime a dozen?" You certainly would if you did not stop and think.

Remember, getting a job, a good job in which you will be happy, is an art and one which you will have to learn the hard way—we have only one suggestion, keep away from those who *think* they know you, they really don't!

Clear thinking will always make a monkey out of the propagandist whose statements are based on half-truths or no truths at all. Keep your health and sense of humor; *use* your brains; and the Law of Probability says you will be happy.

Appointed: Clifford A. Hampel, F.A.I.C., as manager of the chemical equipment division of Fansteel Metallurgical Corp., North Chicago, Ill., to be responsible for engineering, design and sales of products to the chemical process industries, including acidproof tantalum equipment. As a consulting chemical engineer, Mr. Hample holds 35 patents. He is the editor of *Rare Metals Handbook* (Reinhold, 1954) and the *Encyclopedia of Chemical Reactions* (Reinhold, 1953-1957).

Transferred: The executive offices and sales headquarters of Jefferson Chemical Co., Inc., to 411 Fannin St., P. O. Box 303, Houston 1, Texas.

New Position: For Almon G. Hovey, F.A.I.C., who is industrial scientist in charge of organic applications research at Olin Mathieson Chemical Corp., New Haven, Conn. He was recently in charge of vehicle development at Archer-Daniels-Midland in Minneapolis.

To Nicaragua: Dr. Francis Joseph Weiss, F.A.I.C., scientific consultant on food and nutrition, who has left for Managua to join the United States Operations Mission to Nicaragua. Dr. Weiss has been selected by the International Cooperation Administration, which is now a part of the Department of State, to advise and assist the Government of Nicaragua in the development of agriculture and natural resources.

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LABORATORY APPARATUS — REAGENTS AND CHEMICALS

Some Problems of Chemists in a Growth Industry

Dr. E. H. Northey, F.A.I.C.

Special Assistant to Director of Laboratories, American Cyanamid Company, Pearl River, New York

(Presented when the author received the Honor Scroll of the New Jersey AIC Chapter, at the Military Park Hotel, Newark, N. J., May 5, 1955.)

The chief problem in a growth industry is growth of complexity, culminating in an acute attack of the disease, "high viscosity of organization." The cure for it is prescribed here.

OURS IS THE outstanding growth industry. Many chemical companies double in size about every ten years. This has obvious advantages in opportunities for the individual chemist to grow with the industry. The question is, in what direction? This comes back to the individual largely and the goals he sets for himself after taking a good look in the mirror. Where and what would he like to be and be doing ten years hence? What are his abilities, family responsibilities, and what sacrifices is he prepared to make to get there?

If he is a scientist and wishes to remain one, several of the larger companies have created positions giving compensation and recognition which provide for ample growth in this direction, with or without taking on duties of research supervision. If he leans toward development, rather than research, roughly the same opportunities are open. Either course means hard digging or exceptional brilliance, plus some breaks, to come up with a few things which make money and impress management with one's ability.

There are opportunities for the technical man in production, sales and management of chemical companies where his chemical background gives him a material advantage, provided he likes people, is an extrovert, uses every opportunity to learn of these other aspects of the business and recognizes opportunities when they arise.

But the chief problem for chemists, as well as others, in a growth industry is growth of complexity. Some increased complexity of doing business is inevitable with growth but complexity can easily become a disease!

At the start of a chemical enterprise one man may have invented a useful chemical product, devised a practical method of synthesis, further developed a manufacturing process and set up a small-scale manufacturing unit (really a pilot plant) with second-hand equipment in his neigh-

bor's garage, using money he borrowed from friends. Finally, he started production of the chemical assisted by Joe from down the street. He also learned about selling the chemical the hard way, by pounding the pavement.

Now, forty years later, each of these functions must have its own department in the company, plus the Patent, Legal, Tax, Accounting, Advertising, Budget, Market Research, Medical, Purchasing, Traffic, and Employee Relations Departments, as obviously no one person can deal with all phases of the business in a large company. There is even the Procedures Department whose duties are to prescribe how things are to be done, particularly where more than one department is concerned! Communication between the various people who may be involved in, say launching a new product, has become a major problem with endless meetings, letter writing and telephone calls, necessary to get all informed and agreed on a course of action. Naturally this takes time and the time of well-paid people. Overheads go up. Soon new products which have to be priced competitively are ruled out. At this point, the company has an acute attack of the disease, "high viscosity of organization."

The spreading of responsibility is one symptom of the disease. In an advanced case, ten men, who constitute a committee who make a wrong decision, can each point a finger to the right as they sit around the large, oval table. Top management is never able to catch up with the culprit! Even more damaging than a few wrong decisions by such a group are the many delayed or compromised decisions, instead of positive decisions to do something soon. No one's neck is stuck out very far, but an aggressive competitor is apt to get there "fustest with the mostest" and capture the market. There is really no substitute for giving broad responsibility to one, very able, man if rapid progress is to be made in a segment of the business.

An able man of my acquaintance, who found himself suffering from high viscosity, left a large company, at some sacrifice of salary, to take a position in a relatively new, small company, where as he expressed it, "I won't have so many people tugging at my coat tails, holding me back. Recently things on which I tried to make progress gave me little satisfaction, even if they ultimately succeeded."

What is the cure? Is the patient doomed? Well there have been deaths, but I don't think the disease is necessarily fatal. The biggest business of all, the United States Government, had an acute attack and has taken some heroic measures, even involving surgery, to attempt a comeback. That great general practitioner, Herbert Hoover, has prescribed a regimen which we all hope will pull the patient through. Large chemical com-

panies have tried decentralization as a cure, but the recent rash of mergers in the industry must have opened up many new symptoms of the disease, including management headaches.

Each of us can use prophylactic measures against the contagion of increased viscosity, by making every effort to keep procedures as simple as possible and lines of communication open at all times. We must each avoid the temptation of the inept man to make things complicated, because he fancies this makes his own job look important and more secure.

Presentation to Dr. Northey

DR. E. H. NORTHEY, F.A.I.C., special assistant to the director of laboratories of the American Cyanamid Company at Pearl River, N. Y., received the Honor Scroll of the New Jersey Chapter of THE AMERICAN INSTITUTE OF CHEMISTS, at a dinner meeting held at the Military Park Hotel, Newark, N. J., May fifth.

Dr. Raymond E. Kirk, F.A.I.C., dean of the Graduate School, Polytechnic Institute of Brooklyn, N. Y., who was Dr. Northey's first chemistry teacher at the University of Minnesota in 1922, introduced Dr. Northey.

"The American Institute of Chemists," Dr. Kirk commented, "is more interested in the chemist as a man, than the man as a chemist. Dr. Northey, who joined the AIC as a young Associate, later acquiring the needed experience to become Member and then Fellow, has always shown his deep interest in the chemist as a man. For example, as a former chairman of the AIC Committee on Employer-Employee Relationships, he was responsible for the report entitled "The Employed Chemist and His Employer." Now this report is the Magna Carta of the employed chemist. No one has a right to say he knows anything about the subject of the employed chemist until he has read the Northey report."

Dr. Northey, who was born in Stillwater, Minn., received the A.B. and Ph.D. degrees from the University of Minnesota. From 1927 to 1929, he was assistant in organic chemistry at the University, and the following year was Du Pont Fellow there. From 1930 to 1932, he was employed by E. I. du Pont de Nemours & Co. He joined the American Cyanamid Company in 1932 as organic chemist in the Calco Chemical Division, in which he later became group leader and then assistant director of research. From 1945 to 1950 he was administrative director of Cyanamid's Stamford Research Laboratories. In 1950 he became assistant to the vice president of research at Cyanamid's New York office, later becoming technical director of the Fine Chemicals Division. In 1955 he became special

Dr. Northey and Dr. Mackinney

assistant to the director of the laboratories at Pearl River. He has been active in professional societies, and has served as councilor of the AIC and on many of its committees.

The citation on the Honor Scroll to Dr. Northey reads:

To Elmore Hathaway Northey

In recognition of his outstanding professional contributions, not only as administrator, but as AIC councilor, author of professional articles, and inspired committee chairman, whose work has materially aided the professional status of chemists.

Dr. H. W. Mackinney, chairman of the New Jersey Chapter, presented the Honor Scroll to Dr. Northey, who responded with "Some Problems of Chemists in a Growth Industry." (See preceding pages.)

Outstanding students of chemistry or chemical engineering in colleges in New Jersey were also honored by the presentation of AIC student medals to them. Accompanying the students were faculty sponsors:

Andrew David Batcho of Rutgers University was sponsored by Dr. John S. Showell.

Barry Miller of Princeton University was sponsored by Dr. Walter Kauzmann.

Lionel James Sirois of Newark College of Engineering was sponsored by Dr. M. Lelyn Branin.

Miss Lorna J. Tregoning of Douglass College, Rutgers University, was sponsored by Dr. Roger S. Sweet.

The guest speaker for the evening was Dr. Charles D. Flory of Rohrer, Hibler and Replogle, personnel consultants. His paper on "Keep the Gears in Mesh," appears in this issue of THE CHEMIST.

Copies of the Report on "The Employed Chemist . . ." are available at 15c each from the Secretary of the AIC.

Announced: By the American Agricultural Chemical Company, 50 Church St., New York, N. Y., the appointment of Dr. G. H. Benham, F.A.I.C., as director of the research and process development program. Dr. Benham has been, for the past five years, supervisor of biochemistry research at Armour Research Foundation, Chicago, Ill.

To Europe: Dr. Alexander Silverman, Hon. A.I.C, who attended the meetings of the 14th International Congress of Pure and Applied Chemistry and the 17th Conference of the International Union of Pure and Applied Chemistry in July. He is chairman of the Commission on Inorganic Chemical Nomenclature of the International Union. During the week of August first, he visited glass factories in and near Paris.

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Group Insurance Offered by New York AIC Chapter

In a pioneering move among chemical societies, the New York Chapter of THE AMERICAN INSTITUTE OF CHEMISTS is currently offering low cost group accident and health insurance to its members.

Richard L. Moore, Chapter chairman, announced that application blanks and a descriptive folder were mailed to Chapter members on September first, climaxing five years of work by a committee headed by Dr. Robert Ginell. During the enrollment period from September 20th to November 20th, any employed Chapter member under age seventy will be accepted, if two-hundred or more members apply. No evidence of insurability will be required for those who apply during this period. After the enrollment period is closed, applications will not be accepted from "uninsurables" nor from anyone over age sixty.

The cost of a policy under this plan is approximately thirty per cent less than the usual individual policy having similar features. The saving is greater for those over age fifty. Weekly indemnities ranging from $25.00 to $100.00 are available. Sickness benefits continue for two years for each illness; accident benefits continue for five years for each disability. Accidental death benefits and other features are included in the basic coverage.

There are also optional features covering additional death and dismemberment benefits, hospitalization, and surgical fee indemnities. The plan is offered by the Indemnity Insurance Company of North America.

Mr. Moore asks the cooperation of New York Chapter members in applying during the enrollment period to assure that the plan goes into operation. This requires the enrollment of at least two-hundred members before November 20, 1955.

New Position: For Dr. S. D. Koonce, F.A.I.C., who is now manager, Market Research Department, American Cyanamid Company, New York 20, N. Y. He was formerly with Jefferson Chemical Company, Inc.

Appointed: By Schieffelin & Co., 28 Cooper Square, New York 3, N. Y., Franklin H. Bivins, F.A.I.C., as production manager, and Dr. Alfred Halpern, F.A.I.C., as scientific director, of the Pharmaceutical Manufacturing Division. Mr. Bivins was recently with Vitro Rare Metals Co. Dr. Halpern was previously scientific director of E. Fougera Co.

Keep the Gears in Mesh

Dr. Charles D. Flory

Rohrer, Hibler and Replogle, Personnel Consultants,
630 Fifth Ave., New York 20, N. Y.

(Presented before the New Jersey AIC Chapter, Newark, N. J., May 5, 1955.)

MAN is willing to admit that he is a queer animal. This admission does not lead, however, to the conclusion that our strength rests primarily in our queerness. A few seem to believe that the greater their deviation from acceptable behavior, the greater their virtues. This idea led to the publication of a book entitled: *Be Glad You are Neurotic.*

If one knows a little mechanics, he can easily deduce that power in an organism, as well as in machines, is available only when the gears mesh. Those with spinning wheels in their heads may become a "tick-tock" phenomenon but they will do little to pull their weight in the industrial world. This discussion is concerned with the development of people who can and will keep their gears in mesh.

Most employers and many employees recognize the importance of careful selection and intelligent job placement. The financial as well as the human waste resulting from errors of judgment in these areas can be demonstrated so completely that we need not pause to consider that aspect of the problem. What distresses the industrial psychologist is that so many people feel that once the man has been selected and assigned to a job, everything else can be left to experience, or in fact to chance. Horse racers, athletic coaches, and even individual athletic stars take no such chances. They study, train, practice, compete, and develop themselves to the highest pitch possible to achieve their ends. Industrial managers dare not trust to chance development if they want men who can carry every phase of the load that may be placed upon them.

The development of a man depends primarily upon the effectiveness with which the three basic aspects of his personality are geared together. Dr. Fink in a recent book[1] says:

> "Whatever we are and whatever we do depends upon these three things: our . . . biological inner tensions; the environmental pressures around us; and the evaluations . . . we give to what happens within and outside ourselves . . . (These three aspects of our personality) flow into . . . each . . . other . . . like three gears."

The gears mesh if we are well-oriented to ourselves, to our jobs, and to our society.

The biology within each of us is what it is and cannot be changed; environment already has had a major toll for most of us; but our evaluations are

1. Fink, David Harold, *Be Your Real Self*, New York, Simon & Schuster, 1950, p. 59.

in a state of flexibility unless we have settled into a rigid, unbending personality pattern. Rigidity in thinking and in action threatens all of us. It is the struggle to be creative, to taste the fresh, and to explore the untried, that keeps us from settling into the ruts of senescence.

When we seek quick answers for facts beyond the field of our specialty, we are prone to oversimplify and thereby give false evaluations to the phenomena about us. This tendency is especially true when we make judgments about facts in the biological and social sciences. I call your attention to some of the common false evaluations placed on people and their behaviour:

1. *He was born that way.* This is one of the most common rationalizations offered by the executive to excuse himself for failure to develop people. This type of evaluation gets the wheels out of gear because it distorts one side of the triangle. It is fatalistic, for it assumes that what happens to men is merely a matter of genes and therefore beyond the reach of developmental techniques.

2. *If it's big, it's good.* This evaluation is symptomatic of an immature reaction to the world about us. A child is usually of school age before he will accept a dime in preference to a nickel. This childish tendency to evaluate worth in terms of size is common among adults. A Spanish monk, three-hundred years ago, said:

> "The perfect does not lie in quantity, but in quality. All that is best is always scant, and rare, for mass in anything cheapens it. Bigness, alone, never gets beyond the mediocre, and it is the curse of . . . man, that in trying to be everything, he is nothing."[2]

3. *Change is progress.* This type of attitude leads to the notion that if it was made yesterday, it is out of date. It drives us to seek new models, new styles, and new habits. It is often good for business in terms of dollar volume, but it is not good for businessmen in terms of their values and their attitudes toward themselves. Change is progress only when it brings something better to society as well as to a majority of individuals in that society.

4. *If it's old, it's valuable.* The corrective for one error is not to fall into another by resorting to extremes. There are those who contend that we should continue a practice because "we have always done it that way." "It must be good if it has stood the test of time." When we begin to see more good in the past than we see in the future, we have begun to think with our arteries rather than our brain.

5. *To know your faults is to correct them.* The lie was given to this belief by Shakespeare when he said, "If to do were as easy as to know

2. Baltasar Gracian, *A Truthtelling Manual and the Art of Worldly Wisdom*, translated by Martin Fischer, Baltimore: Charles C. Thomas, 1934, p. 37.

what were good to do; chapels would have been churches and poor men's cottages princes' palaces." We must know our faults before we can correct them, but action beyond knowledge is the crucial end of the road to progress. Those who are willing to walk those last rugged miles resolutely are the ones who make the most significant and rapid changes in their personalities.

6. *Stability means good adjustment.* You may think it unusual for a psychologist even to imply that stability could in any way mean poor adjustment. The savage is able to attain stability, but his type of stability prevents him from responding effectively to new situations or from appreciating the new. He is in such perfect balance that he is content with himself and his environment. Learning that leads to growth can take place only by a process of upsetting the equilibrium and then regaining balance. We often feel in times of stress that if we were just able to get over this bump, the road ahead would be smooth. But there are always more bumps for anyone who moves or thinks. The next higher rung is as rough as the one we have just left, but it is through appropriate reactions in the feeling areas that we gain integrity and moral fiber. The most desired stability is expressed in terms of ability to respond effectively under stress and in a dynamic, moving society.

7. *Clothes make the man.* The advertising slogan "save the surface and you save all" plays upon this false premise. We must constantly remind ourselves that "all that glitters is not gold." Let us listen again to the old monk:[3]

> "There ought always to be much more on the inside, than on the outside . . . Some men are all front, like a house half-finished for lack of funds, having the entrances of a palace but the content of a hut."

Let us keep our thinking straight so that we don't put the emphasis on the wrong place. Clothes and surface effect are important but development is genuine only when it comes from the inside out.

8. *Senescence sets in at age* 35. During days of unemployment and in face of an increasing life span, we tended, a few years ago, to look for ways to open employment channels to youth. We did some spurious thinking on this problem. The belief that man is on the decline when he has reached mid-life cannot be evaluated statistically. It must be judged clinically for each man. Some are old before others have reached maturity. In seeking an answer to this problem from history, we find that many men reached their prime after the half-century mark, although the average age of the great men of the past would give them a statistically youthful look—the average life span then made all men young men. Efficiency is more than a matter of years; it is tied with maturity on

3. Gracian, Op. Cit. p. 48.

one hand and deterioration on the other. It is hoped that science will give us a better answer to this problem than personnel expediency now dictates.

9. *Personality is fixed and unalterable.* This type of evaluation is especially dangerous when personality appraisals are made at a given point of time. There is nothing more unfair to an individual than for other persons to appraise him for all time in terms of his personality pattern as of a given moment. For most of us, the changes in personality are relatively slow. But youth and those adults who have distorted personalities, under proper guidance and stimulation, can and do make rapid changes toward higher types of personality integration. Conversely, the effective personality can be pushed into disorganization by applying certain kinds of pressure. While change is not always progress, it is nevertheless normal to expect fluctuations rather than consistency both in behavior and in growth patterns.

10. *Increasing security, increases productivity.* Our "gimme" age has placed so much emphasis upon security, from the cradle to the grave, that it has created attitudes in people which make them want to be taken care of instead of wanting to make a contribution. Security that results in complacency works against productivity instead of for it. Man needs enough security to remove frustration but not so much that he experiences no stimulation.

11. *My behavior is the acceptable norm for all behavior.* The world's oldest sin and one of our current faults is the tendency to project our own weaknesses onto others. In spite of this fact, man typically seeks to duplicate himself when choosing associates, subordinates, or successors. This type of false evaluation is one of the major barriers when a company seeks to improve its managerial personnel. In selecting a management team, we must look for balance instead of duplication.

These false evalutions have been mentioned to point out that the attitudes which we have developed can be changed, because attitudes are the product of our own choice. Through self-examination and appropriate action we can evolve sound values and correct ideas which will help us to help ourselves and in turn help our subordinates. In one's examination of himself, Dr. Fink[4] urges us all to ask ourselves three questions:

"What do I want to have? What do I want to do? And what do I want to be?" If a man can and will answer these questions honestly and somewhat fully, his motivations, his goals, and much of his behavior can be predicted. To stimulate our thinking in a positive direction, I shall make some suggestions to those who are seeking to help others with their growth and development.

No man can be held back in his

4. Fink, Op. Cit. p. 181.

growth if he will develop the following things:

1. A realistic life plan.
2. A unifying philosophy of life.
3. The power of self-criticism.
4. A healthy self-confidence.
5. The desire to know and to understand.
6. A specialty but—.
7. The ability to show affection.
8. A personality ideal.
9. Your own opportunity.
10. An interest in something bigger than yourself.

Let us think briefly about each of these facets in our developmental program:

1. *Develop a realistic life plan.* It has been said of Columbus that "When he started, he did not know where he was going; when he got there, he did not know where he was; and when he got home, he did not know where he had been." Scarcely half of the high school and college men today have a life plan. They have no ambition picture, no goal. They are unable to answer even one of Fink's three questions. I interviewed a man for one of our clients, at age 33, who had not the slightest idea where he was going, in spite of a Naval Academy degree and six years of civilian life following a six year tour of duty during the war. He knew only that he was unhappy. Life plans obviously change as we move ahead, but without a plan to drive one on toward some kind of goal, one seldom succeeds except by chance.

2. *Develop a unifying philosophy of life.* The man who has developed an integrated philosophy of life thinks his way through the world rather than feels his way along. A unity in one's life becomes the hard central core around which everything else revolves. Without this central core, the developmental effort merely pushes out bumps somewhere else, as a depression in a balloon causes it to compensate by bulging out at another place. One with a philosophy of life takes ideas and uses them to foster his own growth and development.

3. *Develop the power of self-criticism.* If a man is really going to grow, he must look himself squarely in the face without fear or favor. No man can be master of himself unless he first understands himself. He must be realistic and objective about his past, present, and future. He must know his strengths and weaknesses, then be willing to apply corrective measures to the liabilities as well as know how to merchandise his assets. We are the greatest advertisers in the world, yet the poorest merchandisers of ourselves. We know how to sell everything except our human relations; we are prone to take that aspect of our life for granted.

4. *Develop a healthy self-confidence.* The dog with his tail between his legs never wins a fight. "Do nothing to make you lose respect for yourself, or to debase yourself in your own eyes; let your own integrity be the standard of rectitude . . . and your dictates sterner . . . than the law." Think of yourself as an aristocrat but

learn to live with your fellows as a democrat.

5. *Develop the desire to know and to understand.* "To be universally interesting, one must be universally interested." Growth cannot take place in a vacuum; neither is it likely to occur in a mere race for sociability or companionship. The man who keeps his curiosity alive, about people, jobs, products, processes, and society in general, is the most likely to get the job just around the corner. That man usually is called lucky, but he knows that he has at least helped luck by striving to know and to understand. He has spent time and effort to prepare himself in line with his life plan.

6. *Develop a specialty but—.* Have a talking acquaintance with many things. The work of the world tends to be done today by specialists, but the specialists are usually managed by people who know more than the specific skills of their job. The more one knows, the better he thinks, because thinking is difficult apart from ideas.

The world changes so fast that most of us are in a race to stay where we are, to say nothing of pushing ahead of the parade. In the decade from 1940 to 1950, consumer income increased by 200 per cent; over 13 million customers died; 17 million families were formed; and 30 million new babies were born. We are adding to the population at the rate of 2.5 millions per year; 6800 a day; 280 an hour and nearly 5 every minute. This rate of growth is an addition to the population equal to that of the state of Pennsylvania every four years. These few facts indicate the need for keeping abreast of the movement in a society so mobile and so fluid as ours.

7. *Develop the ability to show affection.* Many men feel it is a sign of weakness if they admit to the fact that they ever show affection. We have not fully recovered from the last century norm which expected managers to be hard, unsympathetic task masters. The affectional side gives color to our human relations. This aspect of personality is easily developed if we do not systematically block it off. Feelings and attitudes are more contagious than measles. We learn to love or hate; to appreciate or criticize; to be mutual or frigid; usually by contact with those who display such behavior in our environment. Happily married parents in general have happily married children. The optimistic, warm, understanding manager is likely to beget the same affectional relationships among his subordinates. There can be no mutuality and little genuine confidence without some show of feeling toward your fellows.

8. *Develop a personality ideal.* Each of us, to achieve our full potential, must have some standard that pulls us on. That standard could be abstractly set or created, but it is then so mechanical and so cold. We follow best that which we can personify and especially is this true for the young men under us that we seek

to develop. The heroic ideal is more to emulate than to imitate. If the young man sets as an ideal one of the greatest in his line, he has a standard not merely to follow but to spur him on. Such an ideal breaks down only when the ideal becomes an idol or if the amateur seeks to become merely a carbon copy of the master.

9. *Develop your own opportunities.* There are rules to luck just as there are steps to logic. Many persons, however, stand before the gates of fortune waiting for those gates to open; some employ their enterprise to find ways to assist the gates in opening; a few stand before the gates that are wide open and never realize that better things could be had merely by walking straight ahead. Just as hard luck is the due reward for foolishness, so lack of opportunity is commonly the result of indolence. Man can be bigger than the things that happen to him, or he can sit under the debris of life feeling sorry for himself and shrivel with the passing years. It all depends upon the evaluations which we put upon our environment. Are we waiting for our breaks or do we help opportunity by applying effort in the right places, which makes our own breaks for us?

10. *Develop an interest in something bigger than self.* Chesterton once said, "The most important thing about a man is what he believes." That is, the evaluations which he puts on the things surrounding him, love, home, marriage, children, country, God. We have been through some periods of skepticism in the past three decades, but I see the need again for strong men to believe in something bigger than themselves, if they are to help lead their subordinates out of the obvious confusion about us. The egocentric person may be a big shot in his own orbit, but the more inflated his ego becomes, the more he reduces the orbit in which he revolves. As a Chinese proverb says, "The weak man must appear strong, but the strong man can afford to appear weak." The man of strength who believes in something bigger than himself is able to act with humility toward his fellow men and toward the phenomena of the universe of which he is a part. Fosdick once wrote:

> "If a man is seeking primarily after wealth, the world can lick him; if he is primarily after pleasure, the world can beat him; but if a man is primarily growing a personality, then he can capitalize anything that life does to him."

To summarize: Each of us should periodically ask ourselves Fink's three questions: "What do I want to have? What do I want to do? And what do I want to be?" If we can answer these questions directly and frankly, we will have a sense of direction. If we then make sure that our evaluations of life about us are sound, we are well on the road to progress and the kind of success which each of us deserves. What applies to us also applies to those we supervise.

But before we go too far with a

program of developing strong men under us, we need to make sure that it is strength that we really want. The president of Hart, Schaffner and Marx pointed up the dangers in this connection by reference to initiative when he said:

> "The assumption that initiative produces favorable results is . . . subject to question. There is something unsettling about initiative. It tends to be unsympathetic with tradition. It is frequently impatient with authority. It is no great respector of titles. Before an organization sets out to encourage initiative on a large scale, it had better make certain that it is in a position to make good use of that highly volatile commodity. It is strong stuff. I have an idea that many executives who claim to be looking for initiative really want nothing of the sort and they really would be highly embarrassed if they encountered much of it."

I hope there is no one who is afraid to develop capable men under him. The development of people demands goals but it also demands effort both on the part of those who would be developed and those who are to guide the development. Change takes place only when people act appropriately in their efforts to attain their goals.

Corrosion Course: To be given Nov. 14th, by the University of California in cooperation with the Western Regional Division of the Association of Corrosion Engineers. The three-day lecture course features experts in the field. For information: Department of Conferences and Special Activities, University of California Extension, Berkeley 4, Calif.

Installation: Of the Gamma Chapter of Alpha Epsilon Delta, premedical honor society, at Shreveport, Louisiana, was held on May 20th. The ceremonies were assisted by Dr. Emmett B. Carmichael, F.A.I.C., head of the department of biochemistry at the Medical College of Alabama, and former president of Alpha Epsilon Delta. Dr. John B. Entrikin, F.A.I.C., head of the Department of Chemistry at Centenary College of Louisiana, was made honorary member of the society.

Moved: Hazard Advertising Company, Inc., to 444 Madison Ave., New York 22, N. Y.

Human Problems of the Research Director

C. A. Stokes

Director of Research and Development, Godfrey L. Cabot, Inc., 38 Memorial Drive, Cambridge, Mass.

(A condensation of a paper presented at the fall meeting of Industrial Research Institute, Inc., Chicago, Ill., Oct. 25-27, 1954.)

WHEN asked to discuss human problems of the research director, I realized that such a discussion might lead merely to revealing personal biases in dealing with human problems. The problems that I have not fully resolved would seem to be the most important to me. Also I realized what a terrific human problem I might be to some of the people under me, because it all depends upon the point of view.

When you have to discuss a topic and you cannot decide what to say, there is always a sure way out: Make a survey of what others think and talk about that!

So I asked Tom Vaughn what his biggest human problem was. He replied, "People." Not much help! On being pressed for a more definite reply, Tom said communication with the people under him was his greatest problem. However, he qualified this as a problem characteristic of his new job but said this problem had been nearly absent in his former situation.

Warner Eustis said his greatest problem was to inject a little fulminate of mercury into the efforts of competent people. He felt that matching the get-up-and-go-ness of people with basic competence and leadership was not easy and would greatly improve output if it could be done.

Cliff Rassweiler answered my question this way: The human problems break down into:

(1) getting good personnel
(2) keeping personnel
(3) stimulating your people to produce

He commented that keeping personnel was largely a problem of the wives being content with the location and social surroundings.

Now I have other ideas from my survey, but I don't really want to hide behind a survey. Duer Reeves claims he asked me to discuss this because I had strong ideas on the subject. Let us see if I do!

You would perhaps expect me to state that our biggest human problem is the problem of people getting along with each other. Such a statement to me is a meaningless generality, and it does not seem to convey a fact about our particular organization. We have never had to encourage good fellowship. It seems to develop fairly spontaneously and most of the supervisors are not particularly concerned about participating in group social activity.

If I went to the laboratory softball game or bowling league, I think it would spoil the fun of those present because it would be such a strange occurrence. They would suspect that something was wrong if suddenly I quit acting like the freak they are convinced I am. People never get along perfectly for very long. Research people are no different from any other kind. If a research director wants to take on the problems of people getting along together, I suggest two courses of action:

(1) pick the right people, or
(2) take up psychiatry

We usually stick to the first.

The Problem of Creativity

When I ask myself the question: 'What is our greatest human problem in directing research?' it is easy for me to conclude that the greatest problem we face is that of developing creative imagination among the members of our group. I started to say, "the lack of creative imagination," but this is wrong. We have creativity but we need more utilization of it. We must be constantly developing a reserve of creative power to cope with new situations as they arise. Surely the question of developing creative power in one's research associates is a human problem that sits astride progress on every other problem.

Many will disagree with the notion that creative power can be developed. We have been arguing that point in a committee of the Industrial Research Institute for years. We can't even agree that creative power can be measured in any objective manner. Let us avoid that argument and simply say that God-given creative power can be inhibited or stifled. Our big human problem then is how to turn the creative power we have into useful output.

The research director's job does not differ in kind from the business manager's job — only in degree.

A good way to stifle the creative power of human beings is to tolerate "scientific snobbery," the notion that thinking and creating power go along with degrees and honors. Intellectual snobs do not seem to realize that they are not necessarily gifted with any greater creative power or imagination than their less well-educated colleagues. They have merely been trained to analyze ideas at a greater level of efficiency so that they can reject a greater proportion of silly ideas without voicing them and thus avoid the risk of being ridiculed. A truly creative man with limited technical training must run the risk of having ninety-eight bad ideas to get the two good ideas; if he does not voice the whole hundred ideas he may miss the precious two. This takes courage on the part of the research man and tolerance and understanding on the part of the supervisor as well as on the part of the research worker's colleagues. How does one guard against this danger? Perhaps the best thing

is example. The research director and group supervisors can try to encourage by their behavior open-minded thought and be alert to pounce on any attempted intellectual quackery. Another important factor in stimulating creativity is the prevention of frustration.

I shall disregard the human propensity for negative thinking, saying only that encouraging positive thinking is more fruitful than arguing against negative thinking.

The Problem of Developing Leadership

The problem of developing research leadership is a human problem second in importance only to the problem of creativity. It is my view that research leaders must be first good technical men, with imagination, and second, administrators. The view that technical quality and imagination come first and administrative ability must come second may not coincide with yours. It means that we end up with some problems in developing administrators out of men who do not seem to come by that ability naturally. The contrasts required of a leader in a research organization are greater than in most other parts of the business organization. Your research administrator must be on the one hand fully objective and on the other he must encourage all creative ideas, both the good and the bad. He knows that his lack of objectivity for even a short period may cost the company hundreds of thousands of dollars, yet he must not be so objective, even though politely so, that he develops a reputation of being hard and cold, if not almost cruel, in dealing with his colleagues' and subordinates' ideas. For that matter, one cannot recommend being too vociferously objective about the ideas of one's superior. It just is not too healthy. Nevertheless, this is a problem of the research leader and it has been his problem over the centuries. As Thomas Huxley once said, "God give me the strength to face a fact though it slay me."

What we need is practical guidance and suggestions on how to think about developing administrators out of objective high grade technical or scientific people who never thought they would have a need to become administrators, but who because of their scientific and technical qualities and imagination must of necessity be our research leaders. Incidentally, I know of no way to develop a good research leader out of a natural administrative type who just does not have the intellectual capacity for research thinking.

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The Problem of Relationships

There will be a smile on your face if I mention the human problem of the relationships between research men and the salesmen whom they serve in technical service work. What a problem this is! But it has one favorable characteristic: its intensity can be predicted in advance by predicting the sales curve of the company. When sales are up, the problem almost vanishes. When sales start down, the problem becomes increasingly terrifying. We have never solved this problem but we are whittling away on it and perhaps we have some tiny bits of advice to suggest. It seems that the more direct the contact between the technical man and the actual salesman he is expected to serve, the less trouble. Conversely, the more times a sales need is retold or the more times a complaint is complained about as it is passed along, the worse it becomes. Then when it reaches the research organization, if it enters at high level and goes downward, it spreads out again and becomes distorted and so diluted that often the problem cannot be identified with the original, if the two can be put together at all. Therefore, I say to you: Put the men together who can do something about the problem and then tell your man, the research man, to turn his other cheek and take it. You simply cannot argue profitably with the sales department because they sell your product and that is the only way it is turned into dollars.

We research people with our fancy air-conditioned laboratories and wonderful gadgets and nylon lab coats are getting a little too fat and lazy and comfortable to have enough gumption to get out into sales. It is becoming increasingly hard to find a technical man who wants to turn salesman. Now that selling is getting really tough, the technical man is all the more cautious and careful not to leave his comfortable berth in research. If all this is true, then we technical people at least can try to get along with the salesman and help him with his difficult and often lonely job — a job that requires courage and deserves our real support.

The Problem of Time Orientation

There is another problem which to you may seem a little strange, if I label it as a human problem of research directors. It is the problem of time orientation. Technical people and scientists seem to be somewhat less time oriented than the people in the other phases of the business. This is perhaps understandable because the scientist is dealing with facts and ideas and these things are usually timeless. In the other phases of the business, people deal with time oriented decisions and factors. The ability to sell a product you do not have or the ability to sell it after the market is gone are of little consequence. Because the research people

tend a little bit to ignore the time factor in decisions, they arouse the ire of their colleagues in the other parts of the business. This question of inducing the consciousness of the lapse of time is really a human problem. A nice balance of time orientation is necessary to prevent the research man from getting an inferiority complex and a feeling of hopelessness, yet on the other hand getting results in a time schedule so that the other members of the business organization will be able to utilize these results successfully. The time factor really is the important thing in the question of communications which we hear so much about. We have less of a communications problem *per se* than simply a problem of getting information to people in time.

The Problem of Prestige

The problem of prestige was thought by one of my supervisors to be the most important single human problem of the research supervisor. Perhaps he is right, at least in dealing with the scientist type. After all, one of the greatest rewards for this type of man is the satisfaction of knowing that he has invented a theory that works. It is a delicate and dangerous problem to recognize his craving for prestige without inducing the wrong sort of opinion of his scientific omnipotence. Nevertheless, I side with such administrative ideas as creation of research associates or research consultants, and other titles which, while somewhat high sounding, can be made to mean something in a given situation and can be made to convey the recognition needed by the human mental machine.

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The Problem of Logrolling

The tendency to engage in logrolling in a technical organization is a strange sort of thing. In this, people are not necessarily failing to be objective but are just not facing up to the question. They are saying to each other: "You back my project, and I'll back yours. You agree with my results, and I'll accept yours." To accept another man's results on faith after you have kidded yourself into believing he is reliable because he is a wonderful fellow is not necessarily failing to be objective; it is skirting the problem of objectivity at a safe distance — safe, that is, to the individual but not to the organization as a whole. However, it is a circle that must be broken. If the logrolling is done to confuse and defeat the leader or to protect individuals against his injustice, then it is a vicious circle indeed.

Our Greatest Problem

There are few human problems of the research director that could not be helped at least a little by an occasional dose of Kettering's philosophy. Kettering probably is not the best organizer in the world and he probably would fail most of the tests for administrative ability that might be given by the management consultants. I am sure he would fail the psychological tests that some of us have used to pick good research people. Nevertheless with all his faults and peculiarities, he epitomizes much of the best in a research leader. A short time ago he was quoted by *Newsweek* as saying, "It is pretty much of a definite law that man is so constituted as to see what is wrong with a new thing, not what is right. Man has tended to persecute the man with the new idea and, then, if the idea was good, honor him. Even though rightness is seen, the new field and the great possibilities that the new idea opens up will not be visualized . . . that is because not one man in a thousand has imagination." I believe that quotation summarizes our greatest human problem in research.

Completed: The first of three major units in Battelle Memorial Institute's new atomic energy research center, Columbus, Ohio. It is known as a "hot cell" laboratory and it is America's first, of its capacity, to be built without Federal funds.

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World Symposium: On Applied Solar Energy, to be held in Phoenix, Arizona, Nov. 2-5, 1955. It is being co-sponsored by the Association for Applied Solar Energy and Stanford Research Institute of Stanford, Calif.

Announced: By Dr. Sidney D. Kirkpatrick, Hon. A.I.C., the selection of the Dow Corning Corp., Midland, Mich., as winner of the 1955 Award for Chemical Engineering Achievement.

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AIC Activities

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Training Future Scientists

On Wednesday, October 26, 1955, at 8:00 p.m., the American Chemical Society, the American Institute of Chemical Engineers, and The American Institute of Chemists will hold a joint meeting in the auditorium of the Clinton School, Clinton Ave., Plainfield, N. J. The program will be a panel discussion entitled, "Training Future Scientists in Our Schools."

The moderator will be Dr. Warren M. Davis, principal, North Plainfield High School.

The panel speakers will be:

Mr. Harold Hainfeld, president, New Jersey Science Teachers' Association, "Problems Confronting the Science Teacher."

Dr. P. A. van der Meulen, director, School of Chemistry, Rutgers University, "A Professor Looks at Science Education in Our Schools."

Dr. Donald B. Keyes, of Arthur D. Little, Inc., "Scientists and Engineers Can Help Our Schools."

The objective of the meeting is to get the members of the three societies interested in doing something to help our schools and to show how they can most effectively do it.

The panel talks will be followed by a discussion period and a social hour. Members of the sponsoring societies are asked to bring science teachers as their guests. Because of the importance of the subject and its general interest, the public is invited to attend and to participate in the discussion.

New York Chapter

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Eisenschiml to Address New York Chapter

"A Bird's-Eye View of the Chemical Profession" will be the title of a talk by Dr. Otto Eisenschiml, chairman of the Board of Scientific Oil Compounding Co., before the New York AIC Chapter, Thursday, October 20th, at The Chemists' Club. This dinner meeting will be held in honor of all past chairmen of the New York Chapter. Gold keys will be presented to all living past chairmen by Richard L. Moore, the present chairman.

Dr. Eisenschiml is not only famous for his scientific and industrial career, but also is the author of twelve books, and an authority on the War Between the States, on Lincoln, and on crime detection by chemical methods. In his talk, he will make proposals on how the chemical profession can be raised in the public esteem, and how people can be made to understand what the chemist does, and what his job means.

The meeting, open to all interested persons, will start with cocktails sponsored by Evans Research & Development Corporation, at 5:30 p.m., dinner at 6:30 p.m., followed by the presentation of awards to past chairmen, and Dr. Eisenschiml's talk. Tickets for the dinner are $4.50. Reservations should be made with S. Stigman, Foster D. Snell, Inc., 29 W. 15th St., New York 11, N. Y.

Invitations to all known past chairmen of the New York Chapter are being sent out, but some of the older records are incomplete. Mr. Moore requests that all past chairmen communicate with him at Foster D. Snell, Inc., 29 W. 15th St., New York 11, N. Y., in order that the list may be as complete as possible.

Will You Come

Sept. 14, 1955. Luncheon for AIC Members and guests. 12:15 p.m. in connection with ACS National Meeting, Minneapolis, Minn.

Sept. 20, 1955. Enrollment of members of New York Chapter in Group Insurance Plan. (See page 330).

Oct. 12, 1955. National Council and Board of Directors of The American Institute of Chemists. 5:30 p.m. for Board; 6:00 p.m. for Council. The Chemists' Club, 52 E. 41st St., New York, N. Y.

Oct. 20, 1955. Meeting, New York Chapter. The Chemists' Club, 52 E. 41st St., New York 17, N. Y. Cocktails sponsored by Evans Research & Development Corp., 5:30 p.m. Dinner 6:30 p.m. Presentation of awards to past chairmen of Chapter. Speaker: Dr. Otto Eisenschiml, "A Bird's-Eye View of the Chemical Profession." Tickets for dinner, $4.50. Reservations: S. Stigman, c/o Foster D. Snell, Inc., 29 W. 15th St., New York 11, N. Y.

Oct. 26, 1955. New Jersey Chapter. Joint meeting with A.C.S. and A.I.Ch.E. Auditorium, Clinton School, Clinton Ave., Plainfield, N. J. 8 p.m. Panel Discussion, "Training Future Scientists in Our Schools." Moderator: Dr. Warren M. Davis. Speakers, Harold Hainfeld, Dr. P. A. van der Meulen, and Dr. Donald B. Keyes. Science teachers and other interested persons are welcome.

May 3, 1956. New Jersey Chapter, Annual Honors Meeting, Newark, N. J.

May 9-11, 1956. AIC Annual Meeting. Hotel Statler, Boston, Mass. The New England Chapter will be host.

Opportunities

Doris Eager, M.A.I.C.

AIC members who are seeking positions may place notices in this column without charge.

Positions Available

Section Head: Position of responsibility for formulating technical objectives, determining project priority, assigning programs. Ph.D. in Ch.E., Food Tech., Phys. Chem. or Bio-Phys. M.S. with 5 yrs. exp., or B.S. with 7 yrs. exp. Salary $8,000.

Project Leader: Senior Chemist or Engineer trained in above fields, to execute or direct work under program assigned. Supervise 3 to 10 technically trained persons. Salary $6,500-$8,500.

Associate Technologist: Training in above fields to assist project leader. To direct or conduct laboratory experiments of advanced scientific nature. Not supervisory position, may work with one to five junior personnel. Salary $5,200-$6,500.

Assistant Technologist: M.S. in above fields, B.S. with 2 yrs. exp. Under guidance, conduct experiments of advanced scientific nature. Salary $4,500-$5,200.

Junior Technologist: B.S. in above fields. Perform laboratory experiments under supervision. Salary $4,000-$4,500.

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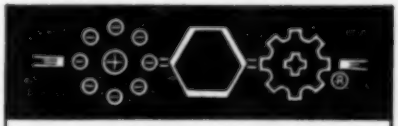

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Chemical Manufacturing Manager: To supervise manufacturing plant of old established chemical firm in Midwest. Will be responsible for about 1000 men. Must have line experience in any chemical field, including responsibility for maintenance. Salary $20,000. Box 99, THE CHEMIST.

Plant chemist: Eastern cement plant desires chief chemist immediately. Prefer man with degree in chemical engineering and experience in the manufacture of Portland Cement. Include in your reply complete details of training, experience, age and other pertinent data. All replies will be confidentially treated and our company personnel knows of this advertisement. Box 903, THE CHEMIST.

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Modern Chemical Processes

By the editorial staff of the Journal of Industrial & Engineering Chemistry. Reinhold Publishing Corp. 8¼" x 11½". *Vol. I,* 220 *pp.* $4.00. *Vol.* 2, 300 *pp.*, $5.00. *Vol.* 3, 276 *pp.* $5.00.

This is a compilation of plant process articles, specially prepared with the cooperation of expert management, in which plant details are elaborately described and discussed, resulting in authoritative and reliable descriptions of seventy distinct industries. These are valuable books with information not otherwise readily available.

—DR. JOHN A. STEFFENS, F.A.I.C.

Enzymologie

By O. Hoffmann-Ostenhof. Springer-Verlag. Vienna. 1954. 772 *pp.* 7 x 9¾. $26.65.

The subject matter of this work is mostly descriptive. The enzyme literature, inclusive the year of 1953, has been well covered. Each subject is extensively documented with pertinent references. This interesting book offers profitable and enjoyable reading to those concerned with modern enzymology. There is an author index and a subject index. Printing and binding are excellent.

—DR. HENRY TAUBER, F.A.I.C.

The Elements of Chromatography

By T. I. Williams. Philosophical Library, Inc. vii — 90 *pp.* $3.75.

This small book gives in brief space a practical introduction to the various analytical techniques grouped together under the name chromatography. The author intends the book for the use of students and for research workers interested in an introduction to this field. He has ably fulfilled his intentions.

Major emphasis is given to adsorption, partition and ion-exchange chromatography. No attempt is made to set up rigorous mathematical derivations of the theory of chromatography beyond one brief chapter. With this exception, emphasis throughout is on the practical aspects of the use of chromatography in the laboratory. Careful diagrams and well-chosen color and black and white photographs add immensely to the effect of the clear, logical verbal exposition. The selected bibliography includes references through 1953, which is the apparent date of publication of this volume in Great Britain.

It is a pleasure to read this book since it is written from an authoritative viewpoint but at the same time it does not lose sight of the need for clarity and simplicity in an introductory work.

—J. M. Moran

Hydrocarbons From Petroleum

By Frederick D. Rossini, Beveridge J. Nair and Anton J. Streiff. ACS Monograph No. 121. *Reinhold Publishing Corp.* 556 *pp.* $18.50.

Prefaced by the director of the Petroleum Research Laboratory at the Carnegie Institute of Technology, the associate director of the API Project 6, and the supervisor of that project, this volume brings together the results of the more than 300 man-years of work which has been performed since 1927 by the Project on the composition of petroleum, the fractionation and analyses of hydrocarbons, the development of fractionating processes, the purification and purity of hydrocarbons, and the measurement of their physical properties.

Many charts, graphs and tables are included, as well as literature references to the work of other laboratories. An appendix lists the publications of the API Research Project 6, and gives the authors of these publications and their subjects. General author and subject indices follow.

This is a book which should be found in every technical library and laboratory for the use of researchers in petroleum and related fields. Its tightly packed pages contain just about the sum total of present day knowledge on petroleum hydrocarbons.

—Dr. Frederick A. Hessel, F.A.I.C.

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Chemical Books Abroad

Rudolph Seiden, F.A.I.C.

Gustav Fischer Verlag, Jena: *Grundriss der chemischen Physiologie,* by F. N. Schulz, 4th ed., 254 pp.; DM 10.80—Life; digestion and resorption; blood; urine; metabolic processes; and general dietetics are the main chapters of this comprehensive textbook of chemical physiology.

Fachbuchverlag Leipzig W 31: *Bergbau Chemie,* by H. Stapf; 1954, 427 pp. (244 ill. and 89 tables); DM 18.50—An interesting, illustrated introduction to chemistry, with emphasis of the chemical problems encountered in the mining and metallurgical industries. • *Nahrungsmittel emulsionen,* by N. I. Kosin; 1954, 118 pp.; DM 5.80—This book, translated from the Russian, contains many new ideas for the preparation and analysis of various emulsions used in the food industry.

E. Merck A.G., Darmstadt: *E. Merck's Jahresbericht;* 1954, 397 pp.—This is one of the most useful publications in the fields of pharmacology and therapeutics: the 67th annual report on the progress made by pharmaceutical-chemical research workers and manufacturers in all parts of the world during the year 1953.

G. E. C. Gad Publisher, Copenhagen: *The Identification of Organic Compounds,* by S. Veibel; 4th ed., 346 pp.—A compilation presenting illuminating information about the methods which may be used for the identification of organic compounds through their functional groups.

Walter de Gruyter & Co., Berlin W 35: *Leichtmetallanalyse,* by H. Ginsberg; 3rd ed., 285 pp. (79 ill.); DM 24.80—A selection of the best analytical methods (including techniques and equipment) for the determination of Al, Be, Mg, and Ti in pure form and their separation from many other elements which occur with them in ores and alloys.

Akademie Verlag, Berlin W 8: *Geochemie seltener und nur in Spuren vorhandener chemischer Elemente im Boden,* by A. P. Winogradow; 1954, 250 pp. (5 ill., 119 tables); DM 23.—A translation of the thought-provoking Russian original work reporting on the rare and trace elements which occur in the soils and rocks of Eastern Europe where they form "biogeochemical provinces." The latter are characterized by associations of plants and endemic maladies (dental caries, anemia, goiter, rickets, pica, deficiency diseases, etc). Thus, soil, vegetation, and zoon form a "trinity." • *Allgemeine organische Chemie,* by O. Wichterle; 1955, 911 pp.; DM 39.—This is an excellent translation of the leading Chechoslovakian textbook on general organic chemistry. The presentation of the subject matter has been done with great skill and paper and printing are of high quality.

Sir Isaac Pitman & Sons, Ltd., London W.C.2: *The Chemistry of Micro-Organisms,* by A. Bracken; 1955, 343 pp.;; 30s.—A general account of micro-organisms from the point of view of their chemical nature. Too much space seems to be devoted to the lesser antibiotics, while the important industrial fermentations are condensed to one chapter and dextran is not even mentioned. Nevertheless, it is one of the well-written books in the tradition of the great popularizations of science.

F. E. B.—Archiv, Garmisch-Partenkirchen: *Antioxydantien;* 1954, 47 pp., paperbound DM 25.—A well-organized, concise literature and patent monograph on the chemical agents used for the prevention of spoilage of edible and technical fats and oils. This concise text is based on 116 literature references and 58 European and American patents.

Safari-Verlag, Berlin-Wilmersdorf: *Das Reich der Gesteine,* by K. Krueger; 1954, 469 pp. (208 ill. and 28 maps); DM 19.80—Not a dry book on dead minerals, but a live and instructive discourse of the minerals—from ores, salts, and soils to uranium, gems, coals, mineral oil, natural gas and their role in industry, economy, and culture. Many statistical data supplement the text. The production of the volume is excellent. • *Das Buch der Gifte,* by G. Schenk; 1954, 310 pp. (119 ill.); DM 16.80—This book of poisons tells vividly, and sometimes even dramatically, the story of the poisonous and intoxicating substances—their occurrence in nature, actions, uses and misuses, from ancient time till World War II.

Elected: Chairman of the chemistry section of the Illinois Academy of Sciences, Dr. Charles D. Proctor, F.A.I.C., assistant professor of pharmacology at the Medical and Graduate Schools of Loyola University of Chicago, Ill.

New Position: For Dr. Julian F. Smith, F.A.I.C., who is now teaching chemistry at Lenoir Rhyne College, Hickory, North Carolina. He was formerly consultant in Rockville, Maryland.

Chemical Who's Who

Dr. W. S. Downs and Williams Haynes, Lewis Historical Publishing Co., 265 W. 14th St., New York 11, N. Y., are compiling the 4th edition of *Chemical Who's Who,* and request the prompt cooperation of those invited to supply personal data.

Something New

"CDEC—2-chloroallyl diethyldithiocarbamate." Pre-emergence herbicide. Information. Monsanto Chemical Co., St. Louis 4, Missouri.

"Industrial Mixers & Continuous Ammoniators." Brochure. Davidson-Kennedy Co., Atlanta, Georgia.

"Fisher Recordall." Bulletin FS-251." 12 pp. Fisher Scientific Co., 711 Forbes St., Pittsburgh 19, Pa.

"NeoLine. Corrosion-resistant lining compound." Specifications. Corrosion Engineering Dept., Pennsylvania Salt Mfg. Co., 3 Penn Center Plaza, Philadelphia 2, Pa.

"Selective Adsorption with crystalline zeolites." Information. Linde Air Products Co., Div., of UCC, 30 East 42nd St., New York 17, N. Y.

"Perlauric Acid Salts Combining Soap & Germicidal Properties." Information. BECCO Chem. Div., Food Machinery & Chemical Corp., Buffalo 7, N. Y.

"ASTM Copper Strip Corrosion Standards." Information. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.

"Teflon." Bulletin of applications. Sparta Mfg. Co., P. O. Box 66, Dover, Ohio.

"Manufacturers of Molybdenum Chemicals." Bulletin Ch-6. Climax Molybdenum Co., 500 Fifth Ave., New York 36, N. Y.

"Silicon Carbide Slide Damper for Automatic Flue Control." Information. Electro Refractories & Abrasives Corp., Buffalo, N. Y.

"Pump Chart Spots the Trouble." Bulletin PT. Eco Engineering Co., 12 New York Ave., Newark, N. J.

"Slipicone Spray." Silicone release agent for heat sealing equipment. Information. Dow Corning Corp., Midland, Mich.

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"The Status of Demineralizing in Today's Plants." Technical reprint T-127. Graver Water Conditioning Co., 216 W. 14th St., New York 11, N. Y.

"Plastic Pipe & Fittings Catalog." Alpha Plastics, Inc., 14 Northfield Rd., West Orange, N. J.

"Simplified Approach to Design of Trenches for Carrying acids." Construction Plans No. 608. Request from Corrosion Engineering Products Dept., Pennsylvania Salt Mfg. Co., 3 Penn Center Plaza, Philadelphia 2, Pa.

"Studies of Thermal Conductivity of Liquids", (Supplement to *A Literature Survey of the Thermal Conductivity of Liquids.*) Bulletin 48. 50 cents (no stamps). Engineering Experiment Sta., Louisiana State University, Baton Rouge, La.

"New acetate base diffuser for 'whiteprint' copying work." Information. Anken Chemical & Film Corp., Newton, N. J.

"Impressit." Pressure-sensitive backed memo pads. Information and samples. Allen Hollander Co., 385 Gerard Ave., New York, N. Y.

"Vaccenic Acid, trans-11-oleic acid." Information. Jasonols Chemical Corp., 825 E. 42nd St., Brooklyn 10, N. Y.

"Stepan HDA-7, nonionic of fatty acid alkylolamide type for heavy duty cleaners." Information. Stepan Chemical Co., 20 N. Wacker Drive, Chicago 6, Ill.

"BRC 22 Hydrocarbon—rubber compounding material." Information. Barrett Div., Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y.

"Cenco News Chats." Publication of Central Scientific Co., 1700 Irving Park Rd., Chicago, Ill.

"Fire Protection Manual for Natural Gasoline Plants." 50 cents. American Petroleum Institute, 50 W. 50th St., New York 20, N. Y.

"Ion Exchangers as Catalysts." Bulletin. Technical Service & Development Lab., The Dow Chemical Co., Midland, Michigan.

"Automation Dictionary." Covers 87 words & phrases. Minneapolis-Honeywell Regulator Co., Sta. 213, Industrial Div., Philadelphia 44, Pa.

"Witcarbs in Polyvinyl Chloride Resins." Tech. Service Bulletin. Witco Chemical Co., 260 Madison Ave., New York 16, N. Y.

"Haemo-Sol. Cleanser and solvent for blood stains." Information and samples. Meinecke & Co., Inc., 225 Varick St., New York 14, N. Y.

"Carbowax Polyethylene Glycol 20M, with estimated molecular weight of 15,000 to 20,000." Information. Carbide & Carbon Chemicals Co., Div. of UCC, 30 E. 42nd St., New York 17, N. Y.

"Warren Spectracord Bulletin FS-245." 20 pp. Fast recording-spectrophotometer. Diagrams. Fisher Scientific Co., 717 Forbes St., Pittsburgh 19, Pa.

"Directory of Commercial & College Testing Laboratories." 48 pp. $1.00. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.

"Manpower Resources in the Earth Sciences." Joint Study by National Science Foundation and U.S. Dept. of Labor. 45 cents. Order from U. S. Government Printing Office, Washington 25, D.C.

"Adenosine Phosphates." Information. Schwarz Laboratories, Inc., 230 Washington St., Mount Vernon, N. Y.

"Hi-Lo Automatic Variable Speed Pulley." Information, Dept. KP, Equipment Engineering Co., 2853 Columbus Ave., Minneapolis 7, Minn.

Condensates

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—JACK PICKETT

The newspapers these days devote almost as much space to protons, neutrons, and isotrons as they do to morons.

—*Savannah* (Ga.) *Morning News*

There is no adequate defense, except stupidity, against the impact of a new idea.

—P. W. BRIDGMAN

The art of instructing and enlightening men is the noblest portion and gift within human reach.

—D'ALEMBERT

It's easier to get ulcers from what's eating you than from what you are eating.

—*Mutual Moments*

American industrial development has come about largely through the process of innovation, and it is here that the executive has made his most significant contribution. Philosophers of an earlier day would be astonished to see it has been the businessman, not the social worker, who has condemned and destroyed the *status quo*.

—Crawford H. Greenewalt, F.A.I.C.

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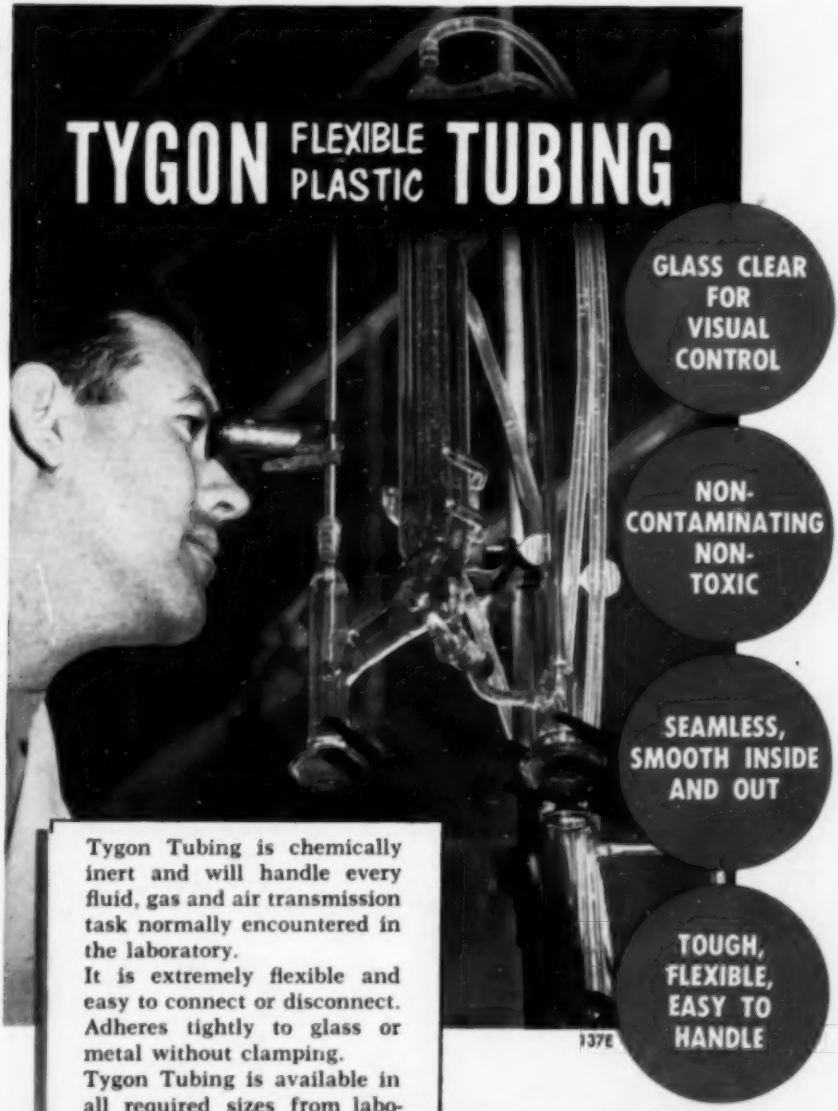
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